

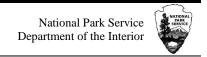
Squishy Marsh Muck: Bugs in the Bayou

Lower Elementary School Courses: Science, English & Language Arts



Lesson Plan Focus:

"Bugs in the Bayou" is swimming teeming with life and activity. Invertebrates of every shape and size are busy scooting around the marsh, searching for food and escaping predators. Explore the wetlands in a new way: get your hands dirty with some marsh muck and learn about the small creatures that form the base of our wetlands ecosystem and food chain.



A note to teachers:

Thank you for your interest in having your students participate in the "World Beneath Your Feet" program at the Barataria Preserve. All of our programs at the Barataria Preserve are free and all supplies for the on-site activities are provided by the National Park Service.

The rest of the document includes all of the background material and instructions for both you the leader and the park ranger who will conduct your program. You are welcome to read the "on-site activities" if you would like to be familiar with what you will be doing during your time at Barataria, but please don't give away all of the fun secrets

We recommend that you attempt to complete at least one pre-visit activity and one post-visit activity included in this document, but understand if you are unable to do so.

Finally, we'd love to hear about your pre-visit and post-visit experiences. Feel free to share photos that were taken during the field trip and of any post-visit artwork that your students create. You can contact your lead ranger for information on how to share your work with us.

What to expect during your program at the Barataria Preserve:

What you will see:

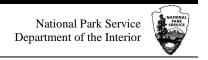
- 23,000 acre wetlands preserve located 16 miles from New Orleans on the west bank of the Mississippi River.
- 3 different types of wetlands habitats- of bottomland hardwood forests, swamps, and marshes
- A safe home for hundreds of plant and animal species.

Keep wildlife wild and safe by:

- Staying on the trails at all times
- No food on trails. We will eat lunch in a designated area.

What to bring:

- Everyone should wear closed toed shoes, like hiking boot or sneakers, and clothes that can get dirty
- Insect repellent and sunscreen
- A refillable water bottle.
- Your sense of fun and adventure!

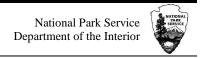


Squishy Marsh Muck: Bugs in the Bayou

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Louisiana Student Standards

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• 1-LS1-1

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• 3-LS1-1

• 3-LS4-2

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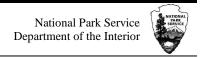
Next Generation Science Standards

Science & Engineering	Disciplinary Core Ideas	Cross-Cutting Concepts
Practices		
Analyzing and interpreting	LSC1 Organization for	 Patterns
data	matter and energy flow in	 Cause and effect
 Asking Questions and 	organisms	 Structure and Function
defining problems	ESS3B Natural Hazards	
Obtaining Evaluating, and	ESS3.C Human impacts	
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information	• ETS1.B. Developing	
 Constructing explanations 	Possible Solutions	
and designing solutions	LS1A Structure and	
 Planning and carrying out 	function	
investigations	LS1D Information	
 Developing and using 	Processing	
models	LS4B Natural Selection	
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Common Core Standards

Writing

LITERACY.W.1.1	LITERACY.W.2.7
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LITERACY.W.2.6	



LITERACY.W.3.7

LITERACY.W.3.8

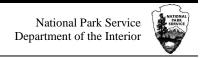
Speaking and Listening

LITERACY.SL.1.1	LITERACY.SL.2.2
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LITERACY.SL.1.6	
LITEDACV CL 2.1	LITERACY.SL.3.2
LITERACY.SL.2.1	LITERACY.SL.3.3
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LITERACY.SL.2.1.B	LITERACY.SL.3.5
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Reading: Literature

LITERACY.RL.2.7

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LITERACY.RL.1.3	LITERACY.RL.3.3
LITERACY.RL.1.7	LITERACY.RL.3.7
LITERACY.RL.2.1	
LITERACY.RL.2.3	



Vocabulary List

Abdomen: one of the three main body segments of an insect and one of the two main body segments of an arachnid. The organism's organs, like the heart, reproductive organs, and digestive organs, are located in this body segment.

Adaptation: A trait or characteristic of an organism that helps it to survive in its habitat.

Arachnid: The class of arthropods that have 4 pairs of legs and two body segments. Spiders, ticks, scorpions, and mites belong to this class.

Arthropod: The phylum of animals characterized as invertebrates and have joined appendages. Arachnids, insects, crustaceans, centipedes, and millipedes belong to this group.

Aquatic: Of the water. An organism that lives in the water.

Beneficial insect or arachnids: Insects that help humans in some way, such as bees pollinating food crops or spiders that eat pest animals like cock roaches or mosquitoes.

Camouflage: The ability of an animal to blend into its surroundings making it difficult to be seen.

Cephalothorax: One of the two body segments of an arachnid. The cephalothorax is the fused head and thorax. The legs, eyes, and mouth parts are located on this segment.

Colony: A group of the same kind of insects that live together and cooperate to defend the colony, raise young, and gather food.

Complete metamorphosis: Insects that go through four stages of metamorphosis- egg, nymph, pupa, and adult.

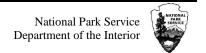
Decomposer: An organism that breaks down dead or decaying material and helps carry out the process of decomposition.

Habitat: The natural home for a plant or animal.

Insect: The class of arthropods that have 3 body segments, 2 antennae and 3 pairs of legs. Some insects have wings, but not all. This group includes butterflies, beetles, grasshoppers, and dragonflies.

Incomplete metamorphosis: Insects that only go through three stages of metamorphosis- egg, nymph, and adult.

Invertebrate: An organism with no back bone.



Macro-Invertebrate: A small organism with no back bone that can be seen with the naked eye.

Poison: A substance that can cause an animal to become sick, or even die, if it is swallowed or if the animal touches it. Poison ivy contains an oil that causes an itchy, burning rash on a human when he or she touches it. Likewise, an animal that eat a Poison Dart Frog from the Amazon rain forest may become sick and die.

Pollination: The act of an insect or other pollinator transferring pollen to the reproductive organs of a plant and enabling fertilization.

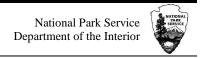
Pollinator: An insect or other organism that pollinates a plant. Bees, butterflies, beetles, some ants, and some wasps are pollinators.

Solitary: An insect or arachnid that does not live in a hive, but rather lives and hunts on its own.

Thorax: The middle segment of an insect. The legs and, if present, the wings are attached to this segment.

Venom: A substance that is injected into an animal via a stinger or fangs and causes the animal to become sick, or even die. Spiders use venom from their fangs to paralyze their prey.

Vertebrate: An organism with a backbone.



Pre-Visit Activity 1: Build a Bug

Grades 1 through 3 Course: Science

Introduction:

What is a bug? "Bugs" are a general term to describe mostly insects and arachnids. In this activity, students will learn the differences between the two groups of animals.

Prior to this activity, teachers should review insects and arachnids with their students. Insect and arachnid diagrams can be found in Appendix III of this document.

Materials:

- Drawing paper, 2 pieces per student
- Pencils
- Crayons or markers
- Clear tape or glue

Learning Goals and Objects:

During this activity, students will:

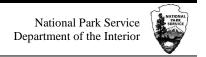
- 1. Use their imaginations to draw either an insect or arachnid
- 2. Deconstruct their drawing and rebuild an insect or arachnid with the correct anatomical parts

After this activity, students will:

- 1. Understand the anatomical difference between insects and arachnids
- 2. Be able to identify the body parts of insects and arachnids.

Directions:

- 1. Pass out materials to each student or a pair of students.
- 2. Instruct students to imagine an insect and draw its body parts of their paper. The body parts can be drawn together or separate, but the images should be large enough to be identifiable once they are cut out. Remind students that insects have 3 body segments, 6 legs, and 2 antennae; some insects also have wings.
- 3. Once everyone is mostly finished their drawing and coloring, instruct the students to cut out each of the body parts and place them in piles (legs, thorax, abdomen, etc).
- 4. Students will now trade insect body parts with each other until they have enough parts to re-build a bug.
- 5. Once students have all of their insect body parts, have them re-assemble and tape their new insect on Build a Bug worksheet found in **Appendix III.**



Pre-Visit Activity 2: Now You See Me, Now You Don't

Grades 1 through 3 Course: Science

Introduction:

Camouflage is the ability for an organism to blend in with its surroundings to make it more difficult for predators or prey to see it. This key **adaption** is common in many organisms, from spiders and beetles, to frogs and snakes, to deer and birds. **Macro-invertebrates**, small animals with no backbone, such as insects and spiders, are both predators and prey to a variety of animals. Because these organisms occupy such a tenuous place on the food chain, they must be able to hide from others in order to keep from being eaten or to sneak up and catch their prey.

There are several types of camouflage tactics that animals can use. Full descriptions of the different forms of camouflage can be found on the National Geographic Education Encyclopedia page:

http://education.nationalgeographic.com/education/encyclopedia/camouflage/?ar_a=1.

Focus:

Students will work together to make an insect or arachnid out of play-dough. The

students will have to choose play-dough colors that will camouflage or match the colors in a piece of scrapbook or patterned paper.

Learning Goals:

During this activity, students will:

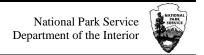
- 1. Work in small groups to create an anatomically correct insect or arachnid
- 2. Work together to choose which colors to use to build their bug that would best camouflage to the paper given

At the end of this activity, students will:

- 1. Be able to describe what camouflage is.
- 2. Be able to discuss how and why camouflage is an important adaptation for insects and arachnids

Materials:

- Several sheets of scrapbook paper or other colorfully patterned paper, 1 sheet per group
- Play-dough, multiple colors to match the different patterned paper
- Small trays or plates



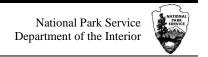
Activity Instructions:

- 1. Prior to activity, the instructor should choose 3 to 5 colors of play-dough for each piece of scrapbook paper. At least 1 of the colors of play-dough should not match the colors in the scrapbook paper. To avoid waste, use a small amount of each color play-dough for each team of students.
- 2. Review the concepts of camouflage and predatorprey relationships with the students.
- 3. Have one or two volunteers pass out the supplies to each group of students. Be sure not to mix up the trays and their corresponding papers.
- 4. Instruct the students that they are to build an insect or arachnid out of the play-dough. The students can create whatever type of bug they wish, but the organism must have the correct body parts and must camouflage to the paper.
- 5. Check comprehension by visiting each group and asking the students what they are building- an insect or arachnid. Ask them how they know it's an insect versus an arachnid. Answers should include "insects have 6 legs, 3 body segments, and 2 antennae," or "my spider has 4 pairs of legs and two body parts." Also, ask the students why they chose the colors they used and how that will help the bug hide from predators or prey.

Discussion questions:

- o How does an insect's adaptation of camouflage help it survive in its habitat?
- How do insects and arachnids hide from their predators or their prey? Why is hiding important?
- Why might insects rely on background matching more so than any other forms of camouflage?
- Can you think of any insect that might use warning coloration or another form of camouflage?
- o How can knowing about insects and arachnids' ability to hide in plain sight help you in your daily life?

*NOTE: to prolong the life of the play-dough, stress that the students are not allowed to mix the colors together.



Pre-Visit Activity 3: Eliza and the Dragonfly

Grades 1 through 3 Course: English & Language Arts and Science

Introduction:

Bugs are all around us! Some bugs are quite beautiful and fill us with wonder, whereas others seem so alien and can scare us. Join Eliza and her Aunt Doris as they discovery and learn about the hidden world of aquatic invertebrates. Horace the Dragonfly Nymph will show your students that even the most alien-looking creatures are beautiful and can help people.

Materials:

- A copy of the book *Eliza and the Dragonfly* by Susie Caldwell Rinehart obtained from a library or bookstore.
- Student worksheets found in Appendix II

Learning Objectives and Goals:

During this activity, students will:

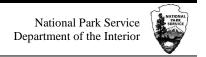
- 1. Read aloud or to themselves all or portions of the book Eliza and the Dragonfly.
- 2. Discuss their feelings and thoughts about the world of bugs around them.
- 3. Identify the roles the insects in the book play in the story.
- 4. Discuss the roles of bugs in their own lives.

At the end of the activity, students will:

- 1. Be able to recognize that some animals completely change their bodies as they mature (metamorphosis)
- 2. Be able to discuss at least 2 ways insects and arachnids help humans.
- 3. Journal or create a piece of art representing their feelings about bugs based on their readings.

Activity Instructions:

- 1. Assign students the book *Eliza and the Dragonfly* to read as either a homework or in-class assignment.
- 2. Have each student complete the *Eliza and the Dragonfly* Student Worksheet found in Appendix II
- 3. After you field trip to the Barataria Preserve, complete the post-visit journaling activity.



Field Trip Activity 1: Dipnetting

Grades 1 through 3 Course: Science

Introduction:

Gross! Marsh Muck! The thick mud and beautiful plant communities of our bayous is home to a large array of organisms. From baby dragonflies to large alligators, animals from every link in the food chain can be found in this rich ecosystem. During this activity, rangers will demonstrate the safe way to look for aquatic macroinvertebrates hiding in the muck. Students will then have a chance to explore this world themselves.

Focus:

Students will join a park ranger and learn how to safely collect insects for observation from their natural habitat.

Learning Goals:

Upon completing the ranger-guided activity, students will:

- 1. Know how to use proper tools to conduct this specific investigation
- 2. Compare and contrast physical traits of captured organisms.
- 3. Engage in a discussion on the relationship between the organisms in their tank and the role the organism plan in a wetlands ecosystem
- 4. Present an oral report of biota found in their tanks

Materials: Provided by the Park Ranger

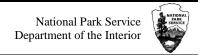
- Aquatic net
- Clear plastic aquarium
- 1 glove per person
- Bug Dial Aquatic invertebrate guide

Activity Instructions:

After a safety talk and introduction to the Barataria Preserve, the Ranger will lead the students in an invertebrate collecting activity. Students will work in small teams of 2-5 students and carry their supplies to the dipnetting area. The Ranger will demonstrate how to safely use the equipment and capture the organisms. Only animals in the aquarium, no mud or plants.

Students will be allowed to break off into their small groups and will be supervised by chaperones as they scoop into the marsh and collect their animals. Students will use provided





field guides to discover what they have caught. Chaperones are asked to not *tell* the students what the animals are, but rather encourage students to use the guides to find out for themselves.

The Ranger will call time and invite everyone back to the center for "show and tell" and a discussion on their sample.

SAFETY NOTE:

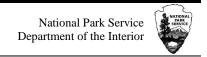
Students will NEVER be allowed to handle the following organisms while dipnetting:

- Alligators, adults or babies
- Snakes
- Turtles

Please note that full participation is mandatory for all teachers and chaperons during this activity. Teachers- please inform your chaperons of the nature of the field trip. All participants should be prepared to go off-trail in the woods where they will encounter bugs and other wildlife.

All education programs at the Barataria Preserve practice capture-and-release techniques. After the students have spent time identifying their organisms, they will release their samples back into the woods. No one will be permitted to take samples home.

• Once all of the students are finished identifying their organisms, the ranger will work with the group to create a larger class chart to total all specimens. The ranger will lead a discussion about the findings.



Post-visit Activity: What's Bugging You?

Grades 1 through 3 Course: Science

Focus:

Students will combine the information they've learned about invertebrates during the previsit activities with their experiences at the Barataria Preserve to create a poster presentation about 1) the role invertebrates play in the wetlands and 2) how insects or arachnids benefit their own lives.

Learning Objectives and Goals:

During this activity, students:

- 1. Will conduct research using books from the classroom or school's library.
- 2. Will work independently or in small groups to produce a poster presentation based on their research topic
- 3. Will reflect on their feelings and ideas about insects and arachnids, focusing on the relationship between, the organisms, their environment, and the students' own lives

After completing this activity, student will:

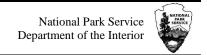
- 1. Be able to identify and discuss the roles invertebrates play in wetlands ecosystems
- 2. Be able to identify ways in which they can help invertebrates survive in their habitats.

Materials:

- Poster paper or drawing paper
- Pencils
- Crayons, markers, color pencils
- Research materials

Activity Instructions:

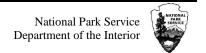
- Students will look through books about insects, arachnids, and other invertebrates and choose one to create a poster about it.
- Each student's poster should include the following:
 - o A drawing of the animal
 - o The animal's name at the top of the poster
 - o A drawing of the animal's habitat, including its food, water, shelter, and space
 - A list of 2 ways the animal helps humans, e.g. bees pollinate flowers, spiders eat harmful insects, earth worms help create new soil.



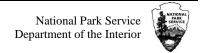
• After everyone completes their posters, they will share them with the class. During his or her presentation, each student should name at least one way he or she help the animal to survive.

Suggested list of invertebrates that can be found in south Louisiana's wetlands:

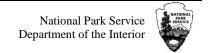
Aquatic Insects	Arachnids & Other Invertebrates
Predaceous Diving Beetle Larva	6-spotted fishing spider
Dragonfly nymph	Crawfish
Damselfly nymph	Blue Crab
Water walking stick	Leech
Snorkel butt	Orchard Orbweaver spider
Water scorpin	Ram horn shell snails
Pond skimmer	Pond Snails
Water boatmen	Claim
Mayfly nymph	Flat worm
Giant Water Bug	Scud
Diving Beetle	
Whirligig Beetle	
Giant Water Bug	



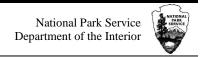
Appendix I: Field Trip Materials



your	With your partner, use the space below to record your observations about surroundings. Then, draw a picture on the back of this paper of the habitat nd you.
	e? Do you see any animals? What do the plants look like? Do you see any water, sticks, chere bugs can hide?
What do you he	ear? Describe the sounds and guess what you think they are.
 What do you sn	nell? Describe the smells and guess what you think they are.
How do you fee	l? Excited? Nervous? Scared? Why do you feel this way?



Use the space below to draw a picture of your surroundings.



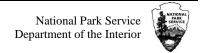
Name:			
name.	 	 	

Directions: With your partner, use field guides to determine what kind of macro-invertebrates you caught during the bug hunt. Record your findings on the chart below and answer the questions when you are finished.

Order	Family	Number Caught- Use tally marks	Total Number
Coleoptera	Beetles		
Collembola	Springtails		
Ephemeroptera	Mayflies		
Hemiptera	True Bugs		
Meglaoptera	Alderfly		
Piecoptera	Stoneflies		
Odonata	Dragonflies		
Odonata	Damselflies		
Trichoptera	Caddisflies		
Araneae	Spiders		
Decapoda	Crawfish		
Decapoda	Crab		
Decapoda	Shrimp		
Shaeriidae	Clams		
Basommatophora	Mussels		
Gnathobdellida	Freshwater snails		
Tubellaria	Leeches		
Caudata	Flat worms		
Caudata	Frogs, toads		
Cypriniformes	Minnows		

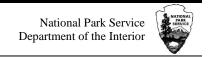
How many total <i>insects</i> did you catch?	
How many total arachnids did you catch?	
How many other invertebrates did you catch?	

Use the back of this page to make an illustration of an underwater bayou scene. What animals will you include? What are they all doing? Are some hiding, hunting, eating, or laying eggs? Use your imagination and your data sheet!



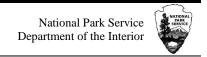
Appendix II:

Eliza and the Dragonfly Activities



Name:	Date:
Eliza and the Dragor	ofly Student Worksheet
Directions: Read the story <i>Eliza and</i> activities below.	the Dragonfly and complete the
•	are "magnificent." Do you like bugs? How do ders, crickets, or ants? Write 3 sentences
2. Horace the dragonfly lives in a pond and water, shelter, and space. He is a pred do you think Horace eats?	d has everything he needs to survive: food, ator with large hooks to catch his food. What

3. Use the space below to draw and label a 4-element food chain that might be found in Horace's pond. Remember to include a producer, some consumers, and a top predator. Horace the Dragonfly needs to be in the food chain, too!



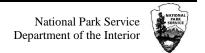
Eliza and the Dragonfly Student Worksheet

4. Horace changes from a bug that swims in the water to a bug that flies through the air. This change is called metamorphosis. Imagine that you have gone through metamorphosis and are flying over a pond that you used to swim in.

Draw a picture of what you see as you fly over your old pond:

5. All bugs have an important job to do in their ecosystems. Brainstorm 3 different bugs that help humans and write down the ways they help us.

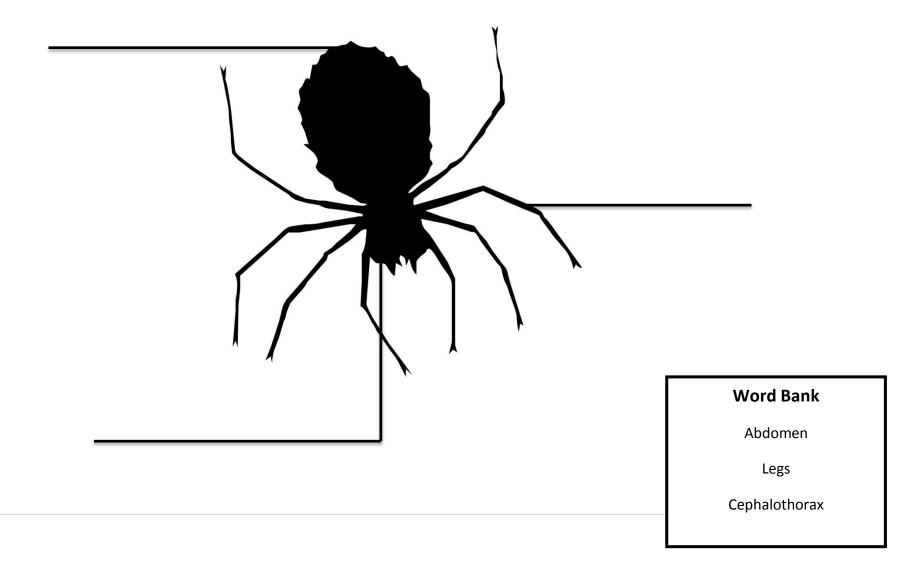
	Type of Bug	How it helps me
Example	Spider	Eats harmful insects like mosquitoes.
1.		
2.		
3.		



Appendix III:

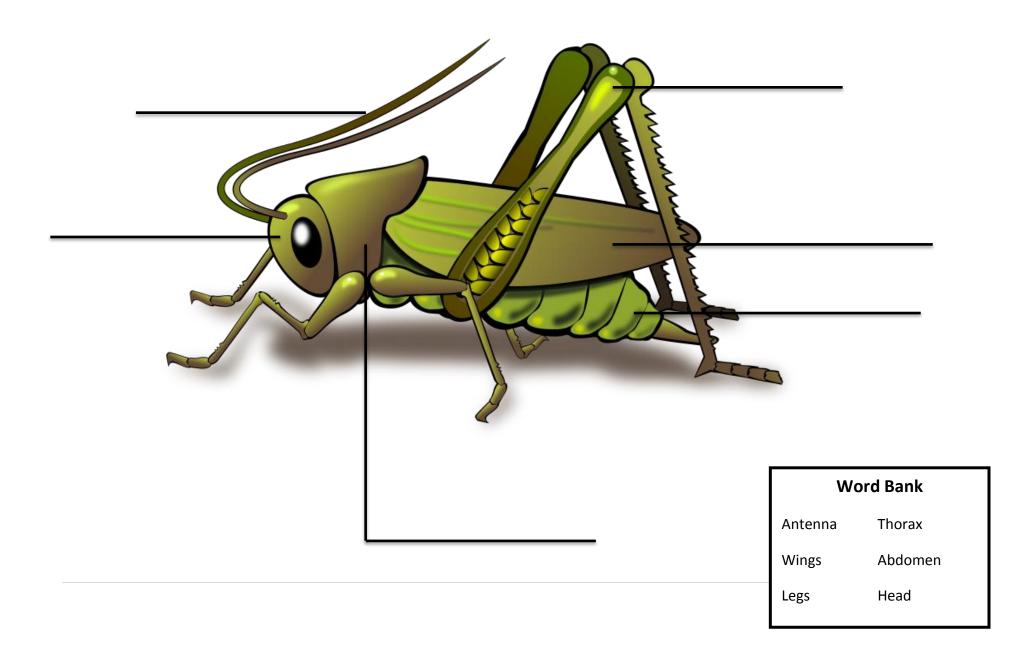
Classroom Activities

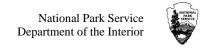
Label the Arachnid



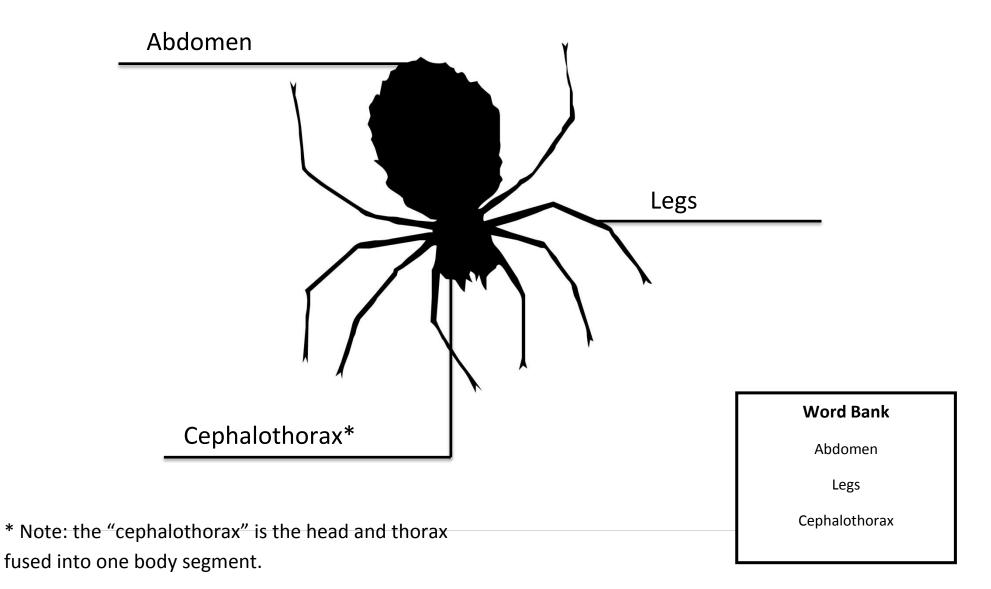


Label The Insect



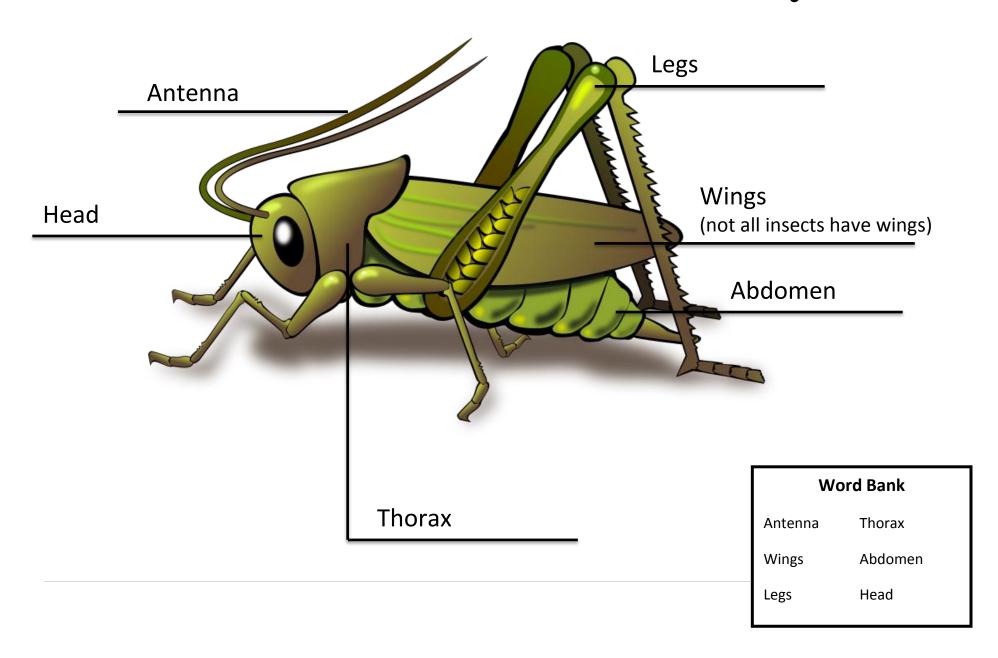


Label the Arachnid- Teacher's Key





Label The Insect- Teacher's Key



Name:	 Date:
,	

Build a Bug!

Directions: Put your bug back together! Arrange your pile of bug body parts on the paper below to form a new insect or arachnid. Be sure you place each body part in its correct spot. Label each body part and answer the questions at the bottom of the page.

Insect Body Parts Word Bank:

Head

Thorax

Abdomen

Leg

Antenna

Wing

Arachnid Body Parts Word Bank:

Cephalothorax

Abdomen

Legs

My	Bug's N	lame:	
,			

My Bug Lives:

My Bug Eats:

National Park Service
Department of the Interior



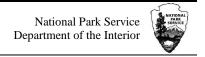
Name:	Date:	
Name:	Date	
Tarric:	Date.	

It's a Bug's World Word Search

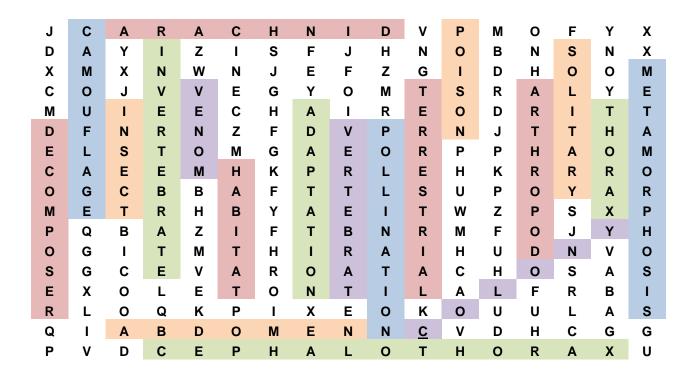
Directions: Search for the words below. Hint: The words go up-and-down, side-to-side, and diagonal, but not backwards.

Word bank							
Adaptation	Arachnid	Arthropod					
Cephalothorax	Colony	Decomposer					
Insect	Invertebrate	Metamorphosis					
Pollination	Solitary	Terrestrial					
Venom	Vertebrate						
	Adaptation Cephalothorax Insect Pollination	Adaptation Arachnid Cephalothorax Colony Insect Invertebrate Pollination Solitary					

J	C	Α	R	Α	C	Н	Ν		D	V	Ρ	M	0	F	Υ	Χ
D	Α	Υ	91	Z		S	F	J	Н	Ν	Ο	В	Ν	S	Ν	Χ
Χ	М	Χ	N	W	Ν	J	Ε	F	Z	G	-	D	Н	Ο	0	M
С	0	J	V	V	Ε	G	Υ	Ο	M	Т	S	R	Α	L	Υ	Ε
M	U	I	Ε	Ε	С	Н	Α	1	R	Ε	Ο	D	R	I	Т	Τ
D	F	Ν	R	Ν	Z	F	D	V	Р	R	Ν	J	Т	T	Н	Α
Е	L	S	T	0	M	G	Α	Ε	0	R	Р	Р	Н	Α	0	M
С	Α	Ε	Ε	M	Н	K	Р	R	L	Ε	Н	K	R	R	R	0
0	G	С	В	В	Α	F	T	Τ	L	S	U	Р	Ο	Υ	Α	R
M	Ε	Т	R	Н	В	Υ	Α	Ε	I	Т	W	Z	Р	S	Χ	Р
Р	Q	В	Α	Z	I	F	T	В	Ν	R	M	F	Ο	J	Υ	Н
0	G	I	Т	M	Т	Н	I	R	Α	I	Н	U	D	Ν	V	0
S	G	С	Ε	V	Α	R	0	Α	Т	Α	С	Н	Ο	S	Α	S
Ε	Χ	0	L	Ε	Т	0	Ν	Τ	- 1	L	Α	L	F	R	В	I
R	L	0	Q	K	Р	I	Χ	Ε	0	K	0	U	U	L	Α	S
Q	I	Α	В	D	Ο	M	Ε	Ν	N	C	V	D	Н	С	G	G
Р	V	D	С	Ε	Р	Н	Α	L	0	T	H	0	R	Α	Χ	U



It's a Bug's World Word Search Answer Key



Insect and Arachnid Venn Diagram

Answer key

- 6 legs or 3 pairs of legs
- 3 body segments
 - o Head
 - o Thorax
 - o Abdomen
- 2 Antennae
- May have 1 or 2 pairs of wings
- Can be herbivores (plant eaters), insectivores (insect eaters), or scavengers (eats dead things).
- May have complete or incomplete metamorphosis

Members of the Phylum Arthropoda

Have jointed appendages

Have exoskeletons

Are macroinvertebrates

Are small

- 8 legs or 4 pairs of legs
- 2 body segments
 - Cephalothorax
 - o Abdomen
- Most are carnivores (meat eatersinsects or other small animals, including other arachnids).
- Very few arachnids, like members of the harvestmen family (daddy longlegs) are omnivores and will eat fungus and decaying materials, in addition to insects.
- Arachnids do not go through metamorphosis, but molt to grow larger

Name:	Date:

Insect and Arachnid

